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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE NATIONAL FORESTS IN TEXAS

by

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INTRODUCTION

Aerial sketch map surveys and ground examinations were conducted on the National Forests in Texas (1,541,427 acres) during late May and early June 1975[2/]. The purpose of this evaluation was to determine the current status of the southern pine beetle population.

METHODS

A 50 percent aerial sketch map survey[3/] was performed in evaluating the southern pine beetle population. Spots were selected at random from the aerial data to be ground checked. During ground observation on the National Forests in Texas, 33 spots containing 112 infested trees were checked.

TECHNICAL INFORMATION

Insect - Southern pine beetle, (Dendroctonus frontalis, Zimm.)

Hosts - All species of southern yellow pine.

Preferred Hosts - Loblolly pine (Pinus taeda L.) and shortleaf pine (P. echinata, Mill.).

Type of Damage - Death of the tree is the result of cambial mining by the southern pine beetle as they construct their galleries. The beetle also introduces the blue stain fungi, Ceratocystis spp., which slows down or blocks conduction of water in the stem.

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2/ Sabine National Forest was not ground checked, since only six scattered single trees were observed during the aerial phase of the evaluation.

3/ Detection of forest pests in the Southeast, 1970. USDA, USFS, SA, S&PF, Div. of FPM, Publ. S&PF 7, Atlanta, Georgia. 51 pp.

Life Cycle of the Beetle - The beetles attack in pairs and construct "S" shaped galleries in the cambial region. Eggs are deposited in niches along the sides of these galleries. The eggs hatch into whitish grubs that further mine the inner bark and construct cells in the bark for pupation. The callow adults then mine through the bark and emerge. The southern pine beetle completes one life cycle in about 30 days during the summer.

RESULTS AND DISCUSSION

Of the 1,640 spots detected in the aerial survey on the National Forests in Texas, 78.2 percent were single tree spots, 18.2 percent were from 2 to 5 tree spots, and 3.6 percent were 6 to 20 tree spots (Table 1). However, Mayyasi et.al., (1975) showed the inadequacy of characterizing southern pine beetle infestations by aerial surveys alone. Fortunately, the error is less in the smaller spot sizes.

Southern pine beetle activity has increased from the 1974 level (2.04 infested trees/M acres [Terry et.al.,1974]) to the current 3.28 infested trees/M acres of host type (Table 2). Infestation ranges from none on the Tenaha and Yellowpine Districts (Sabine National Forest) to 8.50 infested trees/M acres of host type on the Trinity District. Based on our data, the southern pine beetle projects should be terminated on the Tenaha and Yellowpine Districts.

However, recent information collected by the Texas Forest Service indicates an increase in beetle activity on all National Forest Districts. Forty-six multiple tree spots were detected on the Sabine National Forest as compared to no multiple tree spots detected in the June survey. The peak visible southern pine beetle activity was about one month (early July) later this year. The National Forests of Texas should consider projects only on the Districts where the most serious southern pine beetle outbreaks occur. As the Texas Forest Service makes monthly presuppression flights on the National Forests of Texas, the data is currently on hand for the Forest Supervisor to determine District priorities.

REFERENCES

Aldrich, R.C., R.C. Heller, and M.F. Bailey. 1958. Observation limits of aerial sketchmapping southern pine beetle damage in the southern Appalachians. J.For. 56(3):200-202.

Table 1. Summary of aerial survey data - southern pine beetle evaluation, National Forests in Texas. May-June 1975

Ownership (District)	Spot Size (Trees)[1/]				
	Singles	2-5 Spots:Trees	6-20 Spots:Trees	Total Spots:Trees	Average Multiple Tree-Spot Size
Trinity	267	57-165	28-302	352-734	5.5
Neches	76	26-81	0-0	102-157	3.2
San Jacinto	356	75-240	27-265	458-861	4.9
Raven	383	104-312	0-0	487-694	3.0
Angelina	200	36-108	5-50	241-358	3.8
Total all Districts	1,282	298-906	60-617	1640-2804	4.2

[1/] Data corrected and expanded to 100 percent survey area coverage according to Aldrich et al., 1958.

Table 2. Summary of the results of southern pine beetle evaluations conducted on the Trinity, Neches, San Jacinto, Raven, Angelina, Tenaha and Yellowpine Ranger Districts, National Forests in Texas. May-June 1975.

	Ownership Unit (Districts) 1/							
	Neches	Tenaha	Yellow-pine	Trinity	San Jacinto	Raven	Angelina	Total
1. Results copied from data collected during the aerial phase of the evaluation.								
Survey type				50 percent				
Date	5/27	6/3	6/3	6/3	6/4	6/4	6/5	
Total acreage surveyed	188,060	219,120	186,307	206,140	300,204	191,596	250,000	1,541,427
Total susceptible host type acreage	120,320	163,124	137,510	131,929	198,134	126,453	198,500	1,075,970
Total number of spots within survey boundary	102	0	0	352	458	487	241	1,640
Spots per M acres host type	0.85			2.67	2.31	3.85	1.21	2.17
Average spot size (trees)	1.54			2.09	1.88	1.42	1.43	1.52
Range of spot sizes (trees)	1-10			1-15	1-10	1-5	1-10	1-10
2. Results compiled from data collected during ground and aerial phases of the evaluation								
Date of ground phase	6/3			6/3	6/10	6/12	6/4	
Total number of infested trees	471			1,121	900	694	341	3,527
Infested trees per M acres host type	3.91			8.50	4.54	5.49	1.72	3.28
Total volume of infested trees (bd ft)	8,418			90,432	11,620	24,900	16,464	151,894
Total volume of infested trees (cu ft)	0			1,101	1,189	1,686	743	4,719

1/ Corrected and expanded data

Mayyasi, A.M., R.N. Coulson, J.L. Foltz, and A.E. Harvey. 1975. A quality control approach to the evaluation of survey sampling procedures for the southern pine beetle. J. Econ. Entomol. 68:336-8.

Terry, J.R. 1974. Evaluation of southern pine beetle infestations on the Angelina and Sabine National Forest in Texas. USDA For. Serv., SA, S&PF, FPM Group, Report No. 74-2-8.